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length of its year 1,593 days nearly; its orbit is inclined to the plane of the ecliptic at an angle of 13° 4′.

Ceres.—Discovered by M. Piazzi, Jan. 1, 1801. Mean distance from the Sun about 262,000,000 miles; length of year 1,681 days; orbit inclined to the plane of the ecliptic at an angle of 10° 37′.

Pallas.—Discovered by Dr. Olbers, March 28, 1802. Mean distance from the Sun about 268,000,000 miles; length of year 1,686 days 12 hours; orbit inclined to the plane of the ecliptic at an angle of 34° 35′

Jupiter.—Mean distance from the Sun 485,000,000 miles; performs its revolution in 4,332 days 14 hours; its orbit is inclined to the plane of the ecliptic 1° 19′. nearly; rotation on its axis is 9 h. 56 m.; its true diameter is 90,000 miles, and bulk is 1,281 times that of the Earth. The light and heat which it receives from the Sun is about 1-27th of that received on the Earth. Jupiter has four satellites or moons.

Saturn.—Distance from the Sun is above 890,000,000 miles; the length of its year is 10,759 days; its orbit is inclined to the plane of the ecliptic 2° 29′: the length of the day is 10 hours 29 minutes; its true diameter is 76,068 miles; its bulk is 995 times that of the Earth. The light and heat received from the Sun is about 1-98th that received on the Earth. Saturn has seven satellites, and also surrounded with a double ring.

Georgium Sidus—Discovered by Sir William Herschell, on March 13, 1781. Its mean distance from the Sun is about 1,800,000,000 miles; it performs its revolution in about 84 years; its orbit is inclined to the ecliptic 46′ only. The light and heat received from the Sun is only 1-3000th part of the quantity received on the Earth. This planet has six satellites.

METEOROLOGY, &c.

The study of meteorology is highly interesting, inasmuch as we all have a concern in the state of the weather, and are therefore naturally prompted to inquire into the causes of its phenomena. Besides, it is beginning to assume the regularity of a science, while it shows that the Creator has set bounds to variation which it cannot pass, and made sundry apparently conflicting causes to join together in advancing one gracious and beneficent purpose, the welfare of man and the creatures which He has formed for his service.

Evaporation.—If an earthen pan full of water be placed in the open air, and allowed to remain in that situation for some time, the water is found to decrease by little and little, till the whole is consumed. As we are convinced that in glazed pottery it did not ooze through the sides, it could have passed in no direction but that aloft into the atmosphere. In a manner unseen by the human eye, the heat combines with the water, imparts elasticity to this new combination, by which it is borne into the regions above us. This process is called *evaporation*, and the quantity of water which a pan or other vessel would lose in a given time, is called the evaporation for that period. If the inside were graduated, or marked with inches, like an apothecary's measure, we should be able to tell how many inches and parts of an inch it had *evaporated* in a given time. If an experiment were tried in the month of July, we should find that during that time the water had been lowered in the pan by 4.111 inches; this we should call the *evaporation* for July, which on an average is the greatest of any month in the year. The only caution necessary is to protect the pan from the rain, by some sort of shelter, without intercepting the rays of the sun in their descent upon it.

Rain.—Rain is only the inverse of evaporation; the former as gain, the latter as loss. It would be measured by a vessel marked with inches, in the same way as the evaporation, did not the water, as soon as the shower was over, begin to waste. To obviate this inconvenience, and to set the matter in a lively manner before our senses, we will suppose a glass tube, marked with inches, and furnished with a funnel at the top, corresponding with the size of the tube, which would allow the water to enter without allowing the vapour to escape. The number of inches and parts which the water would ascend in the tube during a month would be the *rain* for that period.

Dew Point.—As the combined result of the process of evaporation is constantly carried on at the surface of a piece of water, there must be at all times a certain quantity of invisible vapour in the atmosphere. A question here naturally arises, What is the temperature of that vapour? This might be determined if we could dip the thermometer into it apart from the atmosphere, as we do when we wish to ascertain the exact heat of water; but as this is not possible, it must be attempted by some indirect method which will amount to the same thing. We learn from observation, that if any of the heat be abstracted from this vapour, it falls and settles in the shape of dew upon the nearest object. By means of an instrument, called an hygrometer, we can tell the temperature of the vapour at this moment, and consequently arrive at the very next step below its heat while in a state invisible to the human eye. The point at which the thermometer stands, when placed within the instrument at the moment when the dew begins to fall upon a glass-ball on the outside of it, is called the *dew point*, Since the quantity of vapour is directly as the quantity of heat which it contains, we may consider the quantity of vapour as measured by the heat, and, in speaking, use that term instead of temperature; and thus we may say there is the least quantity of vapour in the atmosphere in January, and the greatest in August, because we find the dew-point, or the temperature of the vapour, for one 34.3°, and, for the other, 55.3°. The more vapour there is in any given space, the greater of course is its weight or density, and the greater is the force with which it would resist any body that attempted to pass through it. Hence these terms, *density*, *force*, and *elasticity* of vapour are often applied to it.

Solar Radiation.—This implies the difference between the point at which a thermometer stands when placed under favourable circumstances in the sun, and one in the open air, but defended from the direct rays of that luminary; in short, it is the difference between shade and sunshine.

Terrestrial Radiation.—If one thermometer be set close to the ground, and one suspended a few feet above it, during the night, and their difference be noted, this is called the terrestrial radiation.

BAROMETER.

We are grown so familiar with this instrument, and so much accustomed to look for fair weather when it is high, and foul when the mercury sinks, that we forget to reflect upon the curious truth which it tells, and think too much upon that which is uncertain, to be sufficiently curious to learn what is certain. It informs us that a column of air, equal to the tube in diameter, but perhaps fifty miles in height, weighs just so much, which may be ascertained correctly, by simply weighing the mercury contained in that tube. It has long been a matter of observation, that northerly winds raise, and southerly winds depress the barometer: these winds alter the weight of the atmospheric column. It usually stands highest during the winter months, at which time the range is greatest. To speak in simple terms, we may say, in winter it rises higher and sinks lower; in summer it does not sink so low nor rise so high; and hence, by taking a mean between its highest and lowest points, at the opposite seasons, we are led to this curious fact, that the air is heavier in summer than in winter.

A Flake of Snow.—When storms and showers of snow " deform the day delightless," we may find entertainment in studying the shape, or rather the arrangement of a flake of snow. It is vapour, in a state of crystallization, having undergone this process in the magazine of vapour from whence it came. Each flake is a collection of crystals, which are often disposed in the form of a six-rayed star, and thus divide the circle of 360 degrees into angles, which approach more or less to sixty degrees. These six rays diverge into secondary branches at the aforesaid angle from each other. The hoar-frost consists of two kinds; one, in which it shoots into needle-like points, when it is said to be *spicular*, and perhaps is caused by the vapour which congeals at the moment of coming into contact with the object; the other kind consists of minute grains from the dew, which was turned to a solid as it rested upon the herbage.